

IFW AF/3722

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Katherine W. Hughes

Serial No: 10/008,060

Filed: 11/13/01

Title: Method and Apparatus for Forming an Inlet and  
Outlet Face of a Catalyst Support

Examiner: Brian D. Walsh

Group Art Unit: 3722

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Transmitted herewith are three (3) copies of an Appeal Brief (8 pages with 1  
page Appendix) in the above-identified application.

Authorization is given by Corning Incorporated to charge the appropriate fee  
and any additional fees necessary due in connection with this filing to Deposit  
Account No. 03-3325.

Respectfully submitted,

Dated: April 28, 2004

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**PATENT**  
SP00-369

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

**Appellant:** Katherine W. Hughes

Appeal Brief

**Serial No.:** 10/008,060

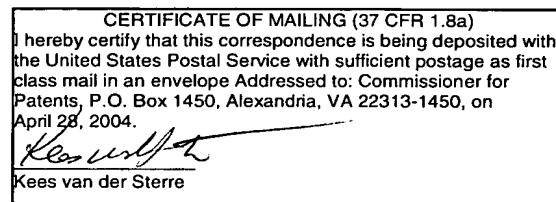
Group Art Unit: 3722

**Filing Date:** November 13, 2001

Examiner: Brian D. Walsh

**Title:** Method and Apparatus for Forming  
an Inlet and Outlet Face of a Catalyst  
Support

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450



Sir:

This Appeal Brief is being filed in triplicate in support of the Notice of Appeal filed herein on March 1, 2004. It contains the following items under the corresponding headings as required by 37 CFR §1.192:

**Real Party in Interest**

**Related Appeals and Interferences**

**Status of Claims**

**Status of Amendments**

**Summary of Invention**

**Issues**

**Grouping of Claims**

**Argument**

**Appendix (appealed claims)**

### **Real Party in Interest**

The real party in interest in this case is Corning Incorporated, assignee of the entire interest in this application by virtue of an assignment recorded 11/13/2001 at Reel/Frame 012373/0148.

### **Related Appeals and Interferences**

There are no related appeals or interferences

### **Status of Claims**

Claims 13-19 remain pending in this application. Claims 13-17 and 19 stand finally rejected under 35 U.S.C. 103(a). Claim 18 has been objected to on formal grounds, as being dependent on a rejected claim.

### **Status of Amendments**

All amendments have been entered, except for a proposed amendment to claim 18.

The proposed amendment to claim 18, although considered by the Examiner to render that claim allowable, was not entered because it was "not deemed to place the application in better form for appeal".

### **Summary of the Invention**

The present invention relates to a method for manufacturing a honeycomb catalyst substrate with shaped inlet and/or outlet faces (page 2, lines 8-9 of the specification). Face shapes that can be provided include convex conical or frusto-conical faces (page 2, lines 14-15 of the specification, and Figs. 2-11 of the drawings).

The inventive method involves rotationally translating a length of cutting filament laterally about the substrate on a path that defines the conical or frusto-conical shaped surface to be provided (page 3, lines 1-20 of the specification). This is accomplished by rotating a pair of wire guides, between which the cutting filament is disposed, about the longitudinal axis of the substrate.

Because both wire guides orbit the longitudinal axis of the substrate, the cutting filament between those guides is oriented to rotate about that axis in the

manner of a spoke about an axle, thus passing transversely through peripheral portions and optionally the axis of the substrate during rotation. Thus the translating wire cuts material from the substrate in a manner that conically shapes the substrate inlet and/or outlet face. The various conical face configurations are provided simply by controlling the longitudinal separation and radial spacing of the guides from the substrate axis (page 2, lines 25-31 of the specification and Fig. 13 of the drawings).

Appellant defines a "conical" surface in the conventional way as a surface of a solid that is bounded by a base plane and formed by a line segment joining every point of the boundary of the base to a common vertex. For the catalyst substrate, the common vertex is the apex or projected apex of the conical surface to be generated. In some cases that apex lies on the longitudinal axis of the catalyst substrate, i.e., the central axis extending along the substrate's length, so that the shaped face is concentric with that axis (disclosed at page 7, lines 15-16 of the specification and exemplified in Figure 4 of the drawings). Alternatively, the vertex of the cone may be spaced laterally from the longitudinal axis so that the conical surface is offset from and thus non-concentric with that longitudinal axis (page 2, lines 30-31 of the specification and Figure 8 of the drawings).

It is apparent from the foregoing description that the present invention is centered on the concept of cutting a workpiece with a laterally traversing filament or wire carried by a pair of wire guides that rotate about or orbit an axis of the workpiece. Importantly, the wire guides need not be pulleys, since longitudinal motion of the wire, e.g. to cut the substrate in the manner of a band saw or jigsaw, is neither critical to the invention nor necessarily required.

### **Issues**

1. Whether the Examiner erred in finally rejecting claims 13-14, 16 and 19 of the application under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 4,782,570 (Spridco) in view of U.S. Patent No. 2,972,669 (Brown) and a non-cited "Holpp et al." document.
2. Whether the Examiner erred in failing to cite or otherwise identify the "Holpp et al." document relied on in support of the Final Rejection of claims 13-17 and 19 of this application.

3. Whether the Examiner erred in finally rejecting claim 15 of this application under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 4,782,570 (Spridco) in view of U.S. Patent No. 2,972,669 (Brown) and U.S. Patent No. 4,208,931 to Collins.
4. Whether the Examiner erred in finally rejecting claim 17 of this application under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 4,782,570 (Spridco) in view of U.S. Patent No. 2,972,669 (Brown) and the non-cited "Holpp et al." document.
5. Whether the Examiner erred in refusing to enter the amendment to claim 18, objected to on formal grounds, in order to place the application in better form for appeal.

#### **Grouping of Claims**

Claims 12-17 and 19 of the application are directed to a process for shaping the end-face of a honeycomb structure into a conical or frusto-conical form without limitation as to the location of the cone axis with respect to the honeycomb longitudinal axis.

Claim 18 of the application is directed to a process for shaping the end-face of a honeycomb into a conical or frusto-conical form having a cone axis spaced away from the honeycomb longitudinal axis.

#### **Argument**

Appellant respectfully submits that the Final Rejection of claims 13-14, 16 and 19 of the application under 35 U.S.C. §103 as unpatentable over U.S. Patent No. 4,782,570 (Spridco) in view of U.S. Patent No. 2,972,669 (Brown) and a reference referred to by the Examiner as "Holpp et al." was clear error.

Preliminarily, it does not appear that the reference referred to by the Examiner as "Holpp et al." is of record in this case. Appellant finds no listing of that reference on any of the Notices of References Cited (PTO 1449 or PTO-892). Further, the Appellant has been unable to find a patent or publication number for that reference elsewhere in the record.

If in fact "Holpp et al." is not of record, then the Examiner was clearly required to withdraw the finality of his Final Rejection and clearly identify and cite the "Holpp

et al." reference for the Appellant's consideration. Absent such identification, it is evident that the Appellant cannot fairly and fully respond to the Final Rejection in this case.

More importantly, even if "Holpp et al." is assumed to have disclosed "the placement of the frusto-conical shape on the catalyst face to achieve good distribution of flow and cold-starting performance" as the Examiner supposes, the combination of that disclosure with the disclosures of Spridco and Brown is still insufficient to teach or suggest the invention. That is because of the clear insufficiency of Brown to disclose a critical feature of the claims.

Appealed claim 19 of the present application critically requires the step of :

"..... rotating first and second guides about the longitudinal axis of the catalyst substrate while a cutting filament extends between the guides;"

The criticality of this limitation resides in the fact that it is not possible to form a conical or frusto-conical end face on a stationary cylindrical honeycomb body with a straight cutting filament unless at least one of the endpoints of the filament is rotated about the axis of the cylinder.

The step of cutting a workpiece with a wire strung between two orbiting wire guides is nowhere taught or suggested in Brown or any of the other art cited by the Examiner in this case. In particular, Brown discloses only apparatus and a method for "band-sawing" a workpiece via electrical discharge machining, with no wire guide rotating about a longitudinal axis of a workpiece. That is, Brown's cutting wire travels longitudinally only. The only lateral movement of the wire through the workpiece results from lateral movement of the workpiece against the moving wire, not from rotational movement of the wire guides. Accordingly, whether used to shape a catalyst substrate or otherwise, the operation of Brown's device cannot anticipate or suggest the Appellant's method.

The principal source of the Examiner's error in this case resides in his attempt to equate the pulley rotation of Brown, or the fact that Brown wire-guiding pulleys can be moved to adjust wire angle or tension, to rotation of the wire guides and wire lengths therebetween about the axis of a workpiece. Brown's wire-guiding pulley rotation permits only longitudinal wire motion, for the obvious purpose of creating a

sawing motion of the wire against the workpiece. Rotation of either one or both of Brown's wire pulleys about the axis of any workpiece during the cutting of that workpiece is not even remotely suggested.

Spridco adds nothing to the teachings of Brown that would lead one toward the Appellant's invention in this case. Spridco teaches only the cross-cutting of continuously extruded ceramic honeycombs to desired lengths for further processing or sale. This planar sawing process is of course well known for ceramic honeycombs as well, as shown by U.S. Patent No. 5,487,694 to Deming cited by the Appellant herein. In neither case do the documents teach anything concerning methods for shaping honeycomb end faces into conical configurations via a pair of rotating wire guides.

Beyond the fundamental mechanical deficiencies of Brown and Spridco, the Appellant has freely acknowledged that honeycombs with conical end faces, and the advantages attending their use, are well known in the art. For example, DE 24 28 964 was cited and made of record herein by the Appellant to recognize that fact. Again, however, the present invention does not reside in any particular conical endface design, but only in a method for efficiently shaping such endfaces on conventional honeycombs. It is for this reason that the Examiner's reliance on "Holpp et al." to establish knowledge of conical end faces is entirely superfluous.

In summary, the Appellant's method of forming a conical honeycomb end face by the rotation of wire guides about the longitudinal axis of a honeycomb substrate is clearly not shown or suggested by either of Brown or Spridco relied on in support of the rejection. Accordingly, the rejection of claims 13-14, 16 and 19 under 35 U.S.C. §103 in this case was clear error, and the Appellant respectfully requests that the rejection therefore be reversed.

The Examiner further rejected claim 15 under 35 U.S.C. §103 as unpatentable over Spridco in view of Brown and U.S. Patent No. 4,208,931 to Collins. Collins was cited to show a cutting apparatus including a cutting filament disposed between two wire guides, with spools for supplying and taking up the filament. Again, however, spool rotation in Collins provides only longitudinal wire travel, and spool translation results only planar cuts across the axis of the material being cut. Thus Collins fails entirely to teach or suggest apparatus or a method wherein the wire guides are rotated about a longitudinal axis of a workpiece.

Absent any disclosure of this feature by Collins, the combination of references again fails to teach or suggest the subject matter of rejected claim 15 of the application, which depends from and thus incorporates all of the limitations of claim 19. Accordingly, the rejection of claim 15 on the cited combination was clear error, and the Board of Appeals is respectfully requested to reverse that rejection.

The Examiner next rejected claim 17 of the application under 35 U.S.C. §103(a) on the combination of Spridco, Brown and the unidentified "Holpp et al." document, citing an alleged disclosure by "Holpp et al." of a catalyst substrate with a frusto-conical end face. Granting, as acknowledged by the Appellant, that catalyst substrates with frusto-conical end faces are known in the art from DE 24 28 964 (of record), Spridco and Brown still fail to supplement that knowledge in a manner that would suggest the subject matter of claim 17 of the application.

The method of claim 17 provides a conical end face that is co-axial with the longitudinal axis of the substrate. That result clearly requires that at least one wire guide rotate about the substrate axis, and that the angle of the thus-rotationally-translated wire be such as to remove more material from the periphery of the substrate than from the center axis thereof. In other words, the wire guide must cause the wire to sweep a conical surface, as only in this way may a co-axial conical taper be imparted to the substrate end face in accordance with the Appellant's method. Clearly this is a motion that neither Spridco nor Brown suggest or disclose.

For the above reasons it is respectfully submitted that the combination of teachings relied on by the Examiner to suggest the subject matter of rejected claim 17 of the application clearly fails to do so. Accordingly, the Examiner's Final Rejection of claim 17 under 35 U.S.C. §103(a) was in error, and the Board of Appeals should reverse that rejection.

Finally, the Examiner has refused to enter an amendment to claim 18 of the application, the effect of which is merely to present the subject matter of claim 18 in independent form. The only basis for objecting to claim 18 was that it was dependent upon a rejected claim.

In response to the Appellant's Amendment Under 37 C.F.R. §1.116 amending claim 18, the Examiner indicated that that formal objection had been overcome. Nevertheless, the Examiner refused entry of the amendment on the ground that it did not place the application in better form for appeal.

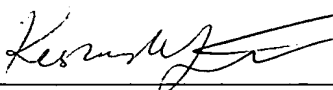


The Appellants contend that this refusal was in error. Had the amendment been entered, claim 18 would have allowed, and no issue with respect to that claim would have been presented. Instead, the Board must now consider again the question which the Examiner had already resolved, i.e., whether the proposed amendment to claim 18 rendered it unobjectionable and therefore allowable.

To enable the Board to consider that issue, the Appellant presents herewith claim 18 as it was proposed to be amended. In that way the Board may consider whether, in its opinion, the proposed amendment would render claim 18 allowable, as the Examiner has supposed. The Appellants respectfully submit that the Board should reverse the Examiner's refusal of entry and allow the amendment of claim 18, at least to reduce the issues to be considered in further proceedings in this application.

In conclusion, the art of record in this case clearly fails to teach or suggest a filament cutting process comprising rotationally translating wire guides that cut a conical end face on a cylindrical honeycomb. Accordingly, the Appellant respectfully submits that claims 13-17 and 19 of this application are were not properly rejected on reference to that art under 35 U.S.C. §103(a), and that the Examiner's rejections on that basis were in error. Accordingly, reversal of those rejections and remand of this application to the Examiner for favorable reconsideration of the Appellant's claims are respectfully solicited.

Respectfully submitted,



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Date: April 28, 2004



**Appendix - Appealed Claims:**

13. The method of claim 19 wherein the first guide and the second guide are located adjacent the catalyst substrate.

14. The method of claim 19, further comprising rotating the first guide relative to the second guide.

15. The method of claim 19 wherein the cutting filament is disposed about an open path that includes a path section extending between the first guide and the second guide.

16. The method of claim 19 wherein the cutting filament is disposed about a closed path that includes a path section extending between the first guide and the second guide.

17. The method of claim 19 wherein the longitudinal separation and radial spacing of the guides are controlled to form a shaped face on the catalyst substrate which is concentric with the longitudinal axis thereof.

--18. (as proposed to be amended) ~~The method of claim 19 wherein~~  
A method for shaping an end face of a catalyst substrate having a longitudinal axis into a conical or frusto-conical shape which comprises:  
rotating first and second guides about the longitudinal axis of the catalyst substrate while a cutting filament extends between the guides; and  
controlling the longitudinal separation and radial spacing of the guides so that the cutting filament is inclined relative to the longitudinal axis of the catalyst substrate and intersects the said axis, and wherein

the longitudinal separation and radial spacing of the guides are controlled to form a shaped face on the catalyst substrate which is non-concentric with the longitudinal axis thereof.--

19. A method for shaping an end face of a catalyst substrate having a longitudinal axis into a conical or frusto-conical shape which comprises:

rotating first and second guides about the longitudinal axis of the catalyst substrate while a cutting filament extends between the guides; and  
controlling the longitudinal separation and radial spacing of the guides so that the cutting filament is inclined relative to the longitudinal axis of the catalyst substrate and intersects the said axis.--